Review Article

Reviewing literature for research: Doing it the right way

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Abstract

In an era of information overload, it is important to know how to obtain the required information and also to ensure that it is reliable information. Hence, it is essential to understand how to perform a systematic literature search. This article focuses on reliable literature sources and how to make optimum use of these in dermatology and venereology.

Key words: Cochrane, literature search, PubMed

INTRODUCTION

A thorough review of literature is not only essential for selecting research topics, but also enables the right applicability of a research project. Most importantly, a good literature search is the cornerstone of practice of evidence based medicine. Today, everything is available at the click of a mouse or at the tip of the fingertips (or the stylus). Google is often the Go-To search website, the supposed answer to all questions in the universe. However, the deluge of information available comes with its own set of problems; how much of it is actually reliable information? How much are the search results that the search string threw up actually relevant? Did we actually find what we were looking for? Lack of a systematic approach can lead to a literature review ending up as a time-consuming and at times frustrating process. Hence, whether it is for research projects, theses/dissertations, case studies/reports or mere wish to obtain information; knowing where to look, and more importantly, how to look, is of prime importance today.

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Literature search

Fink has defined research literature review as a "systematic, explicit and reproducible method for identifying, evaluating, and synthesizing the existing body of completed and recorded work produced by researchers, scholars and practitioners."[1]

Review of research literature can be summarized into a seven step process: (i) Selecting research questions/purpose of the literature review (ii) Selecting your sources (iii) Choosing search terms (iv) Running your search (v) Applying practical screening criteria (vi) Applying methodological screening criteria/quality appraisal (vii) Synthesizing the results.[1]

This article will primarily concentrate on refining techniques of literature search.

Sources for literature search are enumerated in Table 1.

PUBMED

PubMed is currently the most widely used among these as it contains over 23 million

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Table 1: Sources for literature search

Resource	Features
Indexes	
PubMed: www.pubmed.gov	Published by National Library of Medicine Abstracts are free, full text article available depending on source
IndMED: Indmed.nic.in	Articles from Indian journals available
Embase	Extensive coverage of European journals Paid website
Journal collections	
Directory of open access journals: www.doaj.org	Free full text articles
Medknow publications: www.medknow.com	Mostly Indian journals and free full text available
Medind: Medind.nic.in	Collection of Indian journal websites
Clinical trials	
WHO International Clinical Trials Registry: www.who.int/ictrp/en/	Details of International Clinical Trials
Clinical Trials.gov: www.clinicaltrials.gov	Run by the National Institutes of Health
CTRI: www. ctri.nic.in	Maintained by ICMR: Online record of clinical trials in India
EU clinical trials registry: www.clinicaltrialsregister.eu/	Information on clinical trials in European union
Systematic reviews	
Cochrane library	Dependable source of evidence as it is based systematic and extensive review Available free in India (ICMR has renewed license up to 2016)
Up to date: www.uptodate.com	Reviews are subject to extensive peer review, hence a reliable site Paid site
Others	
Psychinfo, Google scholar, books, dissertations, conference literature	

ICMR=Indian council of medical research; CTRI=Clinical trials registry-India

Table 2: Field operators used in PubMed search

Field operator	Command	Example
*	Find alternative endings to this word	Syphil* (syphilis, syphilitic, syphilid)
TIAB	Search for this term in title and abstract	Donovanosis [TIAB]
TI	Searches for this term in the title only	Donovanosis [TI]
Adj	Search for one term within X number of terms from another	PEPadj3seropositive (will find PEP within 3 words of seropositive)
AU	Searches for all articles by a particular author	Yesudian[AU]
JOUR	Searches for articles in a particular journal	Indian J Dermatol [JOUR]

PEP=Postexposure prophylaxis; TIAB=Title abstract; TI=Title; Adj=Adjacent; AU=Author; JOUR=Journal

Table 3: Boolean operators used in PubMed search

Boolean operators	Command	Example
AND	Find articles where both terms appear	HPV AND cervical cancer
OR	Find articles where either term appears	Granuloma inguinale OR donovanosis
NOT	Find articles where one term appears only when the other term is not present	Angiofibromas NOT tuberous sclerosis

HPV=Human papilloma virus

citations for biomedical literature and has been made available free by National Center for Biotechnology Information (NCBI), U.S. National Library of Medicine. However, the availability of free full text articles depends on the sources. Use of options such as advanced search, medical subject headings (MeSH) terms, free full text, PubMed tutorials, and single citation matcher makes the database extremely user-friendly [Figure 1]. It can also be accessed on the go through mobiles using "PubMed Mobile." One can also create own account in NCBI to save searches and to use certain PubMed tools.

Tips for efficient use of PubMed search:[2-4]

Use of field and Boolean operators

When one searches using key words, all articles containing the words show up, many of which may not be related to the topic. Hence, the use of operators while searching makes the search more specific and less cumbersome. Operators are of two types: Field operators and Boolean operators, the latter enabling us to combine more than one concept, thereby making the search highly accurate. A few key operators that can be used in PubMed are shown in Tables 2 and 3 and illustrated in Figures 2 and 3.

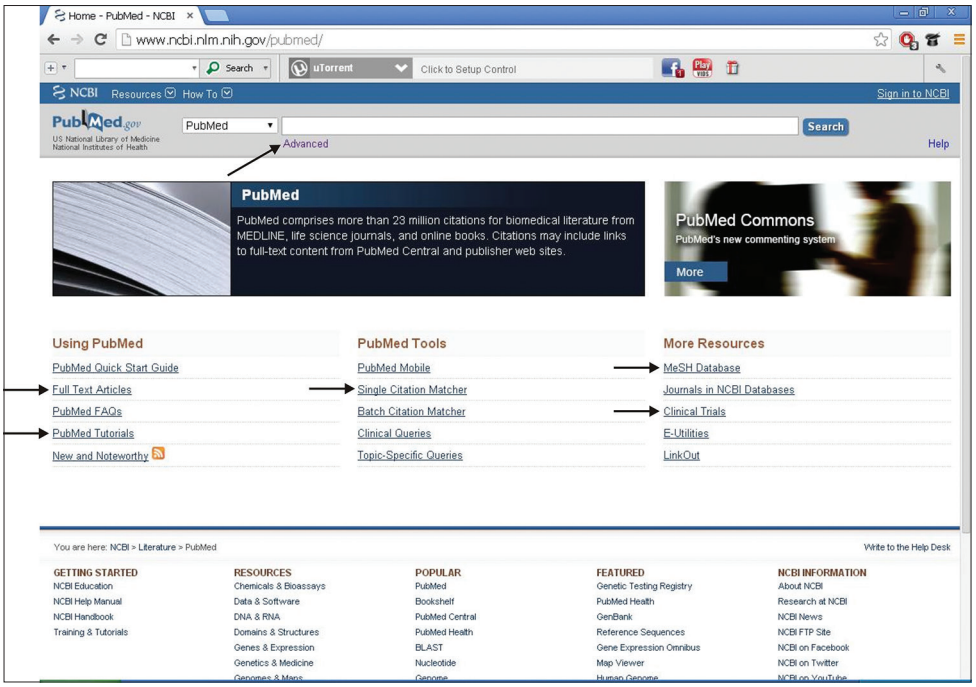

Figure 1: PubMed home page showing location of different tools which can be used for an efficient literature search

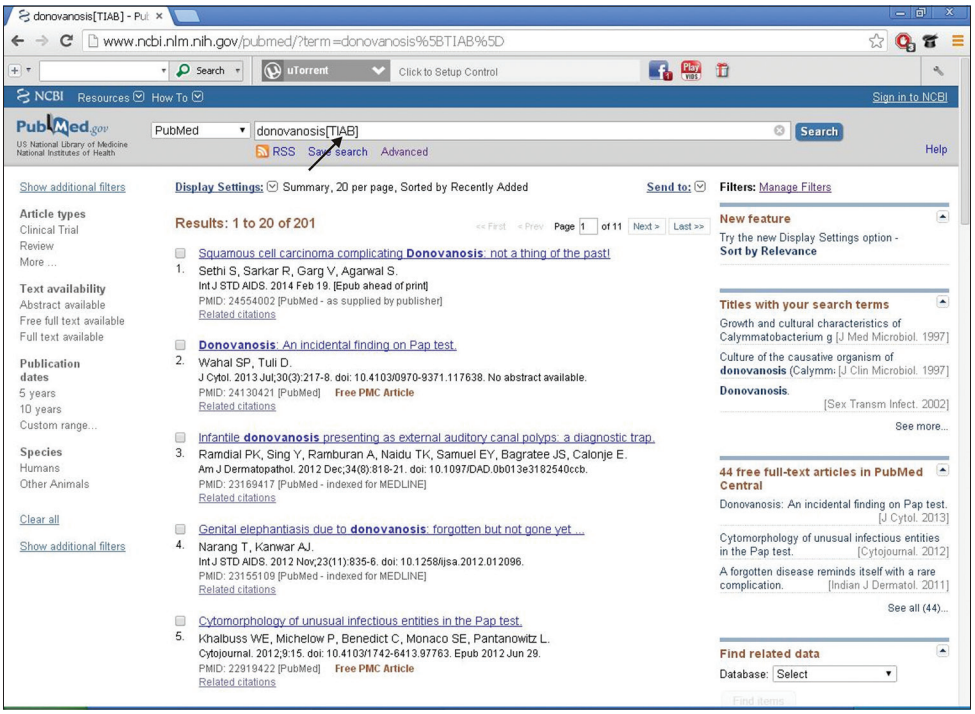

Figure 2: PubMed search results page showing articles on donovanosis using the field operator [TIAB]; it shows all articles which have the keyword "donovanosis" in either title or abstract of the article

Use of medical subject headings terms

These are very specific and standardized terms used by indexers to describe every article in PubMed and are added to the record of every article. A search using MeSH will show all articles about the topic (or keywords), but will not show articles only containing these keywords (these articles may be about an entirely different topic, but still may contain your keywords in another context in any part of the article). This will make your search more specific. Within the topic, specific subheadings can be added to the search builder to refine your search [Figure 4]. For example, MeSH terms for treatment are therapy and therapeutics.

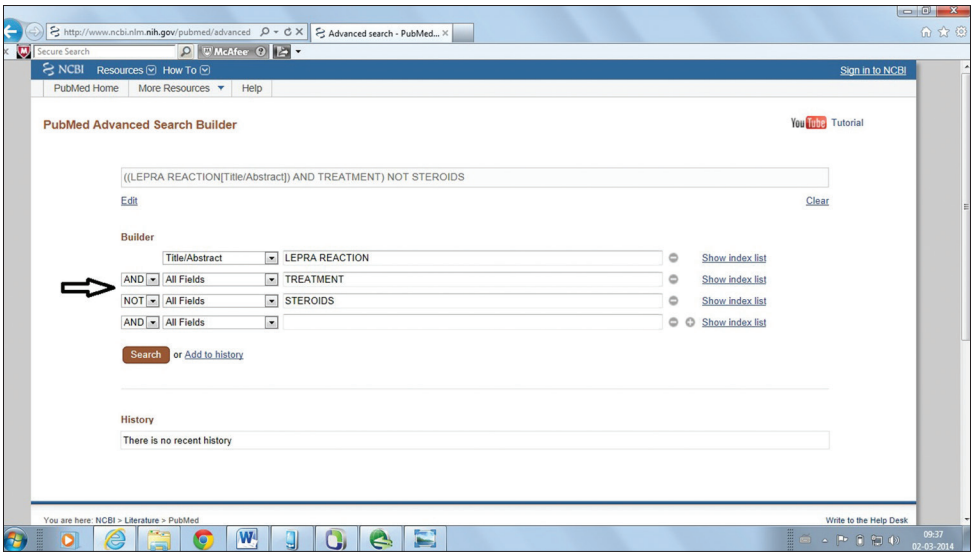

Figure 3: PubMed search using Boolean operators 'AND', 'NOT'; To search for articles on treatment of lepra reaction other than steroids, after clicking the option 'Advanced search' on the home page, one can build the search using 'AND' option for treatment and 'NOT' option for steroids to omit articles on steroid treatment in lepra reaction

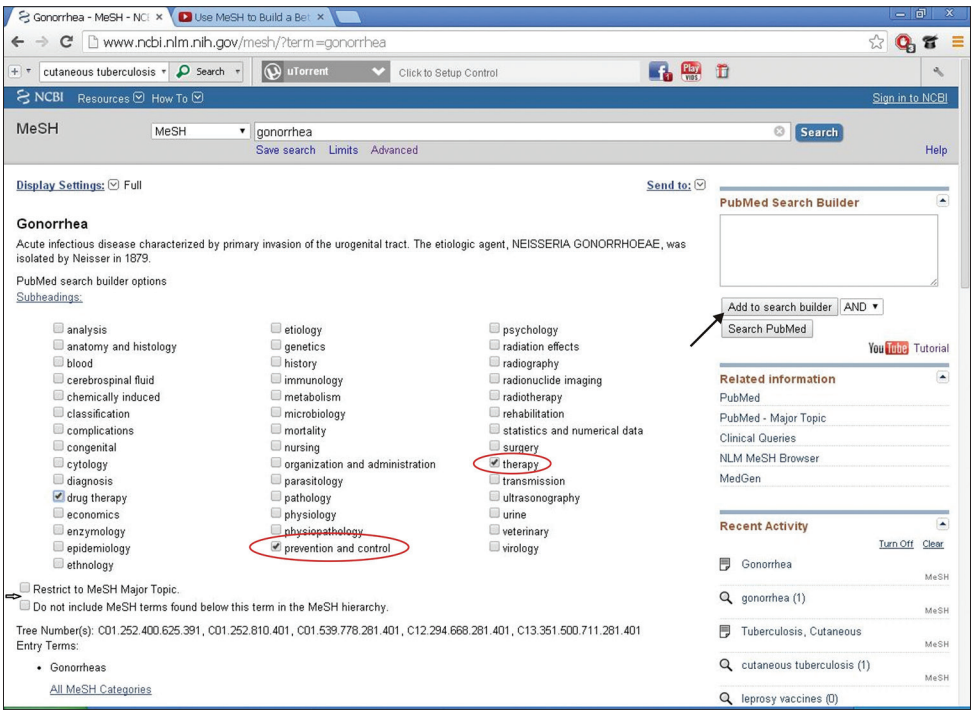

Figure 4: PubMed search using medical subject headings (MeSH) terms for management of gonorrhea. Click on MeSH database (Figure 1) →In the MeSH search box type gonorrhea and click search. Under the MeSH term gonorrhea, there will be a list of subheadings; therapy, prevention and control, click the relevant check boxes and add to search builder →Click on search →All articles on therapy, prevention and control of gonorrhea will be displayed. Below the subheadings, there are two options: (1) Restrict to medical subject headings (MeSH) major topic and (2) do not include MeSH terms found below this term in the MeSH hierarchy. These can be used to further refine the search results so that only articles which are majorly about treatment of gonorrhea will be displayed

Two additional options can be used to further refine MeSH searches. These are located below the subheadings for a MeSH term: (1) Restrict to MeSH major topic; checking this box will retrieve articles which are majorly about the search term and are therefore, more focused and (2) Do not include MeSH terms found below this term in the MeSH hierarchy. This option will again give you more focused articles as it excludes the lower specific terms [Figure 4].

Similar feature is available with Cochrane library (also called MeSH), EMBASE (known as EMTREE) and PsycINFO (Thesaurus of Psychological Index Terms).

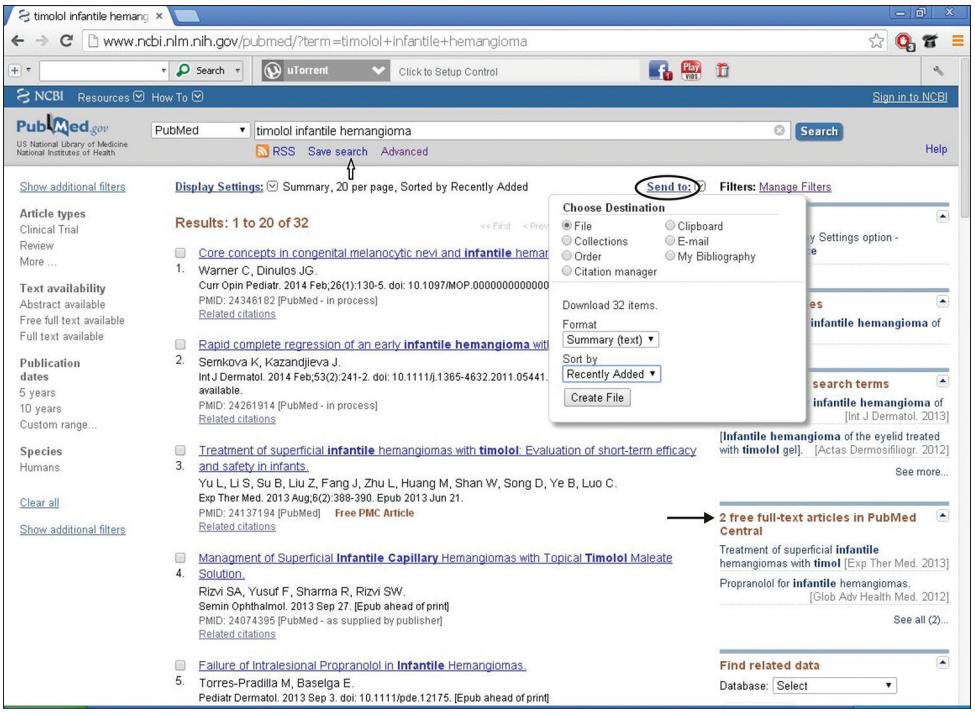

Figure 5: Saving PubMed searches. A simple option is to click on the dropdown box next to 'Send to' option and then choose among the options. It can be saved as a text or word file by choosing 'File' option. Another option is the "Save search" option below the search box but this will require logging into your National Center for Biotechnology Information account. This however allows you to set up alerts for E-mail updates for new articles

Saving your searches

Any search that one has performed can be saved by using the 'Send to' option and can be saved as a simple word file [Figure 5]. Alternatively, the 'Save Search' button (just below the search box) can be used. However, it is essential to set up an NCBI account and log in to NCBI for this. One can even choose to have E-mail updates of new articles in the topic of interest.

Single citation matcher

This is another important tool that helps to find the genuine original source of a particular research work (when few details are known about the title/author/publication date/place/journal) and cite the reference in the most correct manner [Figure 6].

Full text articles

In any search clicking on the link "free full text" (if present) gives you free access to the article. In some instances, though the published article may not be available free, the author manuscript may be available free of charge. Furthermore, PubMed Central articles are available free of charge.

Managing filters

Filters can be used to refine a search according to type of article required or subjects of research. One can specify the type of article required such as clinical trial, reviews, free full text; these options are available on a typical search results page. Further specialized filters are available under "manage filters:" e.g., articles confined to certain age groups (properties option), "Links" to other databases, article specific to particular journals, etc. However, one needs to have an NCBI account and log in to access this option [Figure 7].

The Cochrane library

Although reviews are available in PubMed, for systematic reviews and meta-analysis, Cochrane library is a much better resource. The Cochrane library is a collection of full length systematic reviews, which can be accessed for free in India, thanks to Indian Council of Medical Research renewing the license up to 2016, benefitting users all over India. It is immensely helpful in finding detailed high quality research work done in a particular field/topic [Figure 8].

An important tool that must be used while searching for research work is screening. Screening helps to improve the accuracy of search results. It is of two types: (1) Practical: To identify a broad range of potentially useful studies. Examples: Date of publication (last 5 years only; gives you most recent updates), participants or subjects (humans above 18 years), publication language (English only) (2) methodological: To identify best available studies (for example, excluding studies not involving

control group or studies with only randomized control trials).

Selecting the right quality of literature is the key to successful research literature review. The

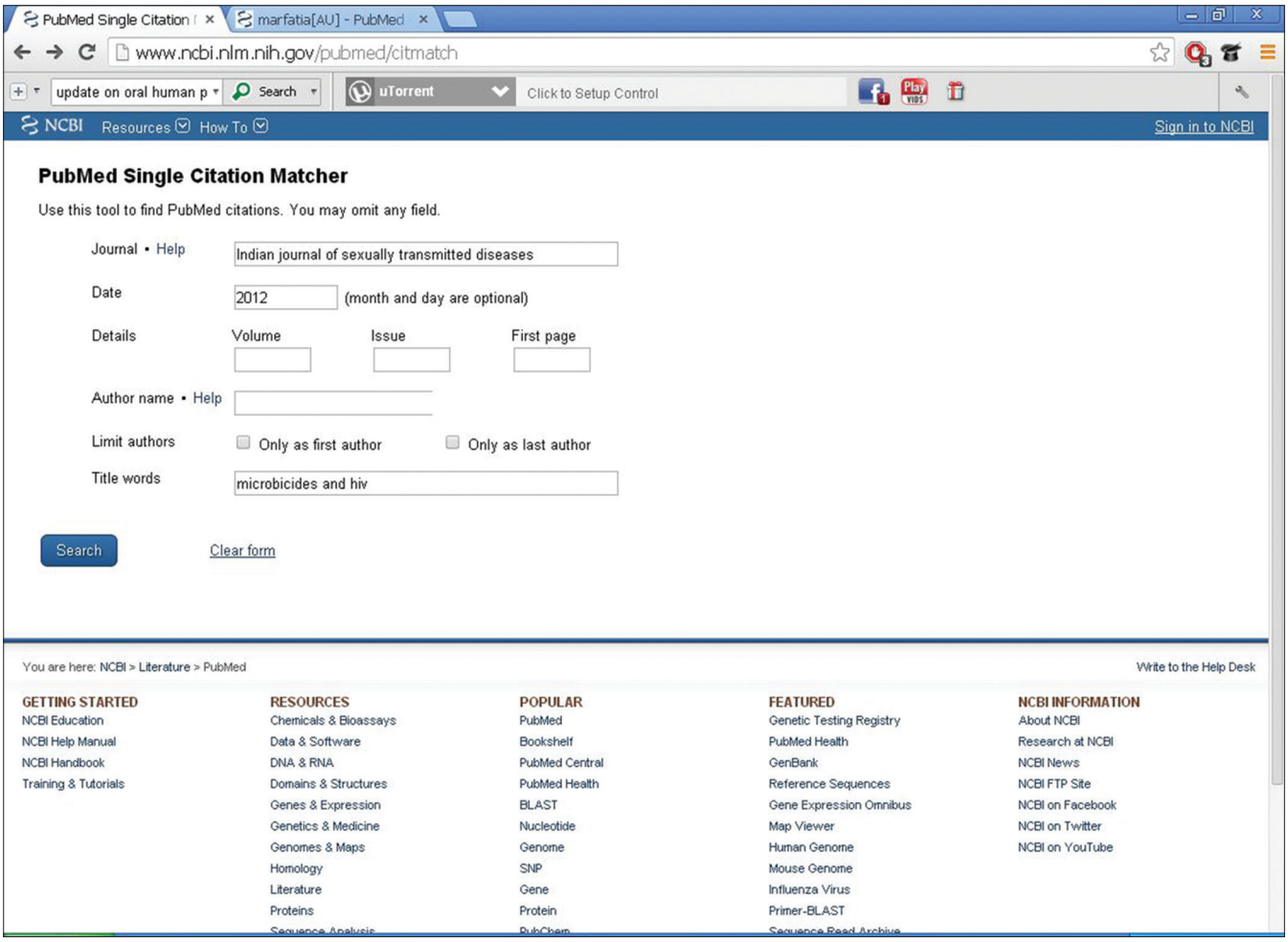

Figure 6: Single citation matcher: Click on "Single citation matcher" on PubMed Home page. Type available details of the required reference in the boxes to get the required citation

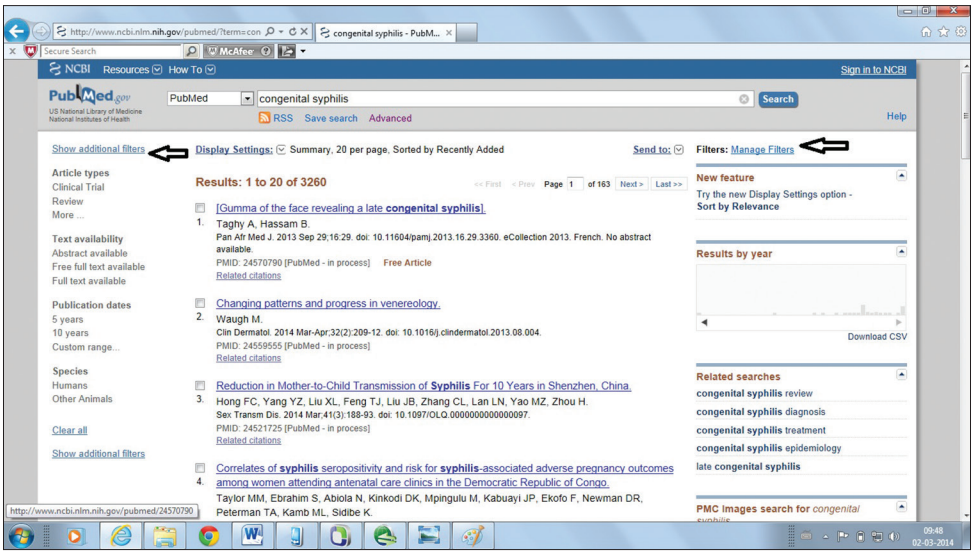

Figure 7: Managing filters. Simple filters are available on the 'search results' page. One can choose type of article, e.g., clinical trial, reviews etc. Further options are available in the "Manage filters" option, but this requires logging into National Center for Biotechnology Information account

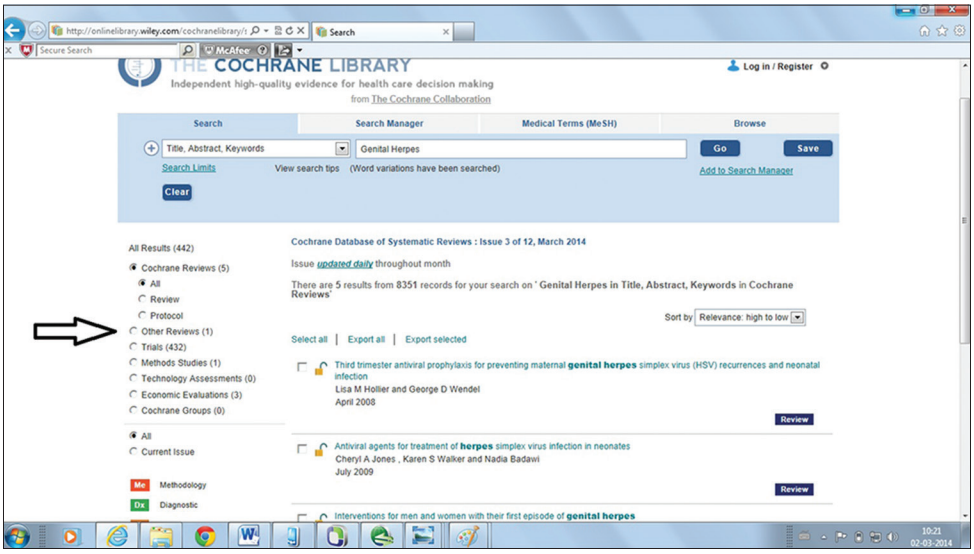

Figure 8: Cochrane library is a useful resource for reliable, systematic reviews. One can choose the type of reviews required, including trials

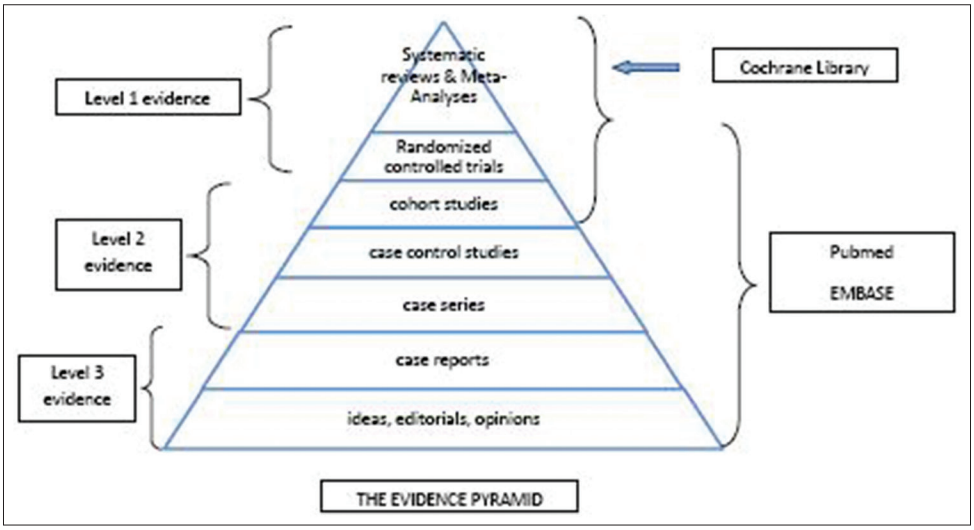

Figure 9: Evidence pyramid: Depicting the level of evidence of references obtained from the aforementioned search tools

quality can be estimated by what is known as "The Evidence Pyramid." The level of evidence of references obtained from the aforementioned search tools are depicted in Figure 9. Systematic reviews obtained from Cochrane library constitute level 1 evidence.

Thus, a systematic literature review can help not only in setting up the basis of a good research with optimal use of available information, but also in practice of evidence-based medicine.

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